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# (12) UK Patent Application (19) GB (11) 2 364 691 (13) A

(43) Date of A Publication 06.02.2002

(21) Application No 0014675.3

(22) Date of Filing 15.06.2000

(71) Applicant(s)

**M.Y. Operations Limited**  
(Incorporated in the United Kingdom)  
Grosvenor Road, Gillingham Business Park,  
GILLINGHAM, Kent, ME8 05A, United Kingdom

(72) Inventor(s)

**Laurence Gerald Williams**

(74) Agent and/or Address for Service

**Serjeants**  
25 The Crescent, King Street, LEICESTER, LE1 6RX,  
United Kingdom

(51) INT CL<sup>7</sup>

**G11B 33/04 , B65D 85/57**

(52) UK CL (Edition T )

**B8P PK5 PL6**  
**U1S S2119**

(56) Documents Cited

**WO 01/48757 A1**      **US 5950821 A**  
**US 5839575 A**      **US 4623062 A**

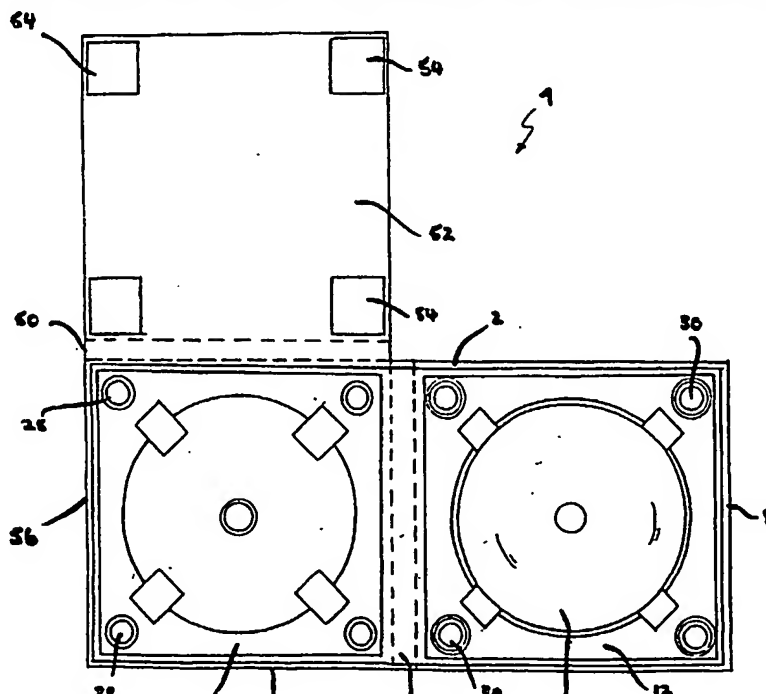
(58) Field of Search

**UK CL (Edition S ) B8P PE2B PE2C PK5 PL6**  
**INT CL<sup>7</sup> B65D , G11B 33/04**  
**ONLINE:WPI,EPODOC,JAPIO**

(54) Abstract Title

**Optical disc packs**

(57) An optical disc pack (1) for packaging optical discs such as CDs, CD-ROMs and DVDs comprises a laminar cover (2) which is preferably made from Folding Box Board and is divided into two cover sheets (6,8) by a spine (4) defining two parallel fold lines. Two disc holding trays (10,12) are thermoformed from plastics material and are attached to the first and second cover sheets (6,8) respectively. The disc holding trays (10,12) each have a circular recess for receiving an optical disc and finger recesses. The first disc holding tray (10) has at least one locking lug (28) and the second disc holding tray (12) has at least one complementary locking hole (30). When the pack (1) is closed by folding the cover along the fold lines (4a,4b), the lug or lugs (28) engages with the hole or holes (30) to secure the first and second disc holding trays (10,12) together. An insert sheet (52) may be foldably attached by a second spine (50) and may have apertures (54) through which the lugs (28) pass when the pack (1) is closed. Also, (Fig.6), the cover sheets may be separated by a base sheet (112).



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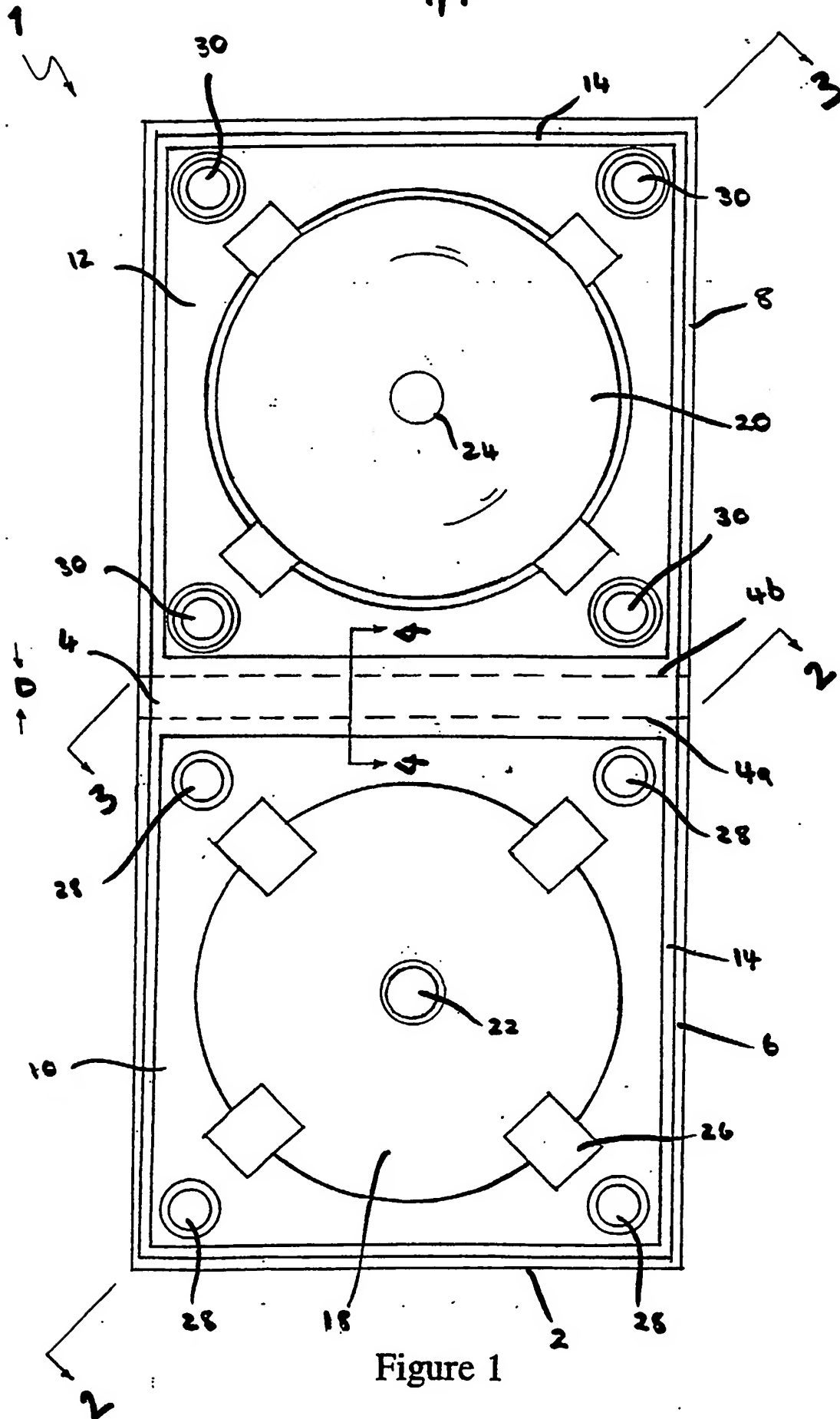


Figure 1

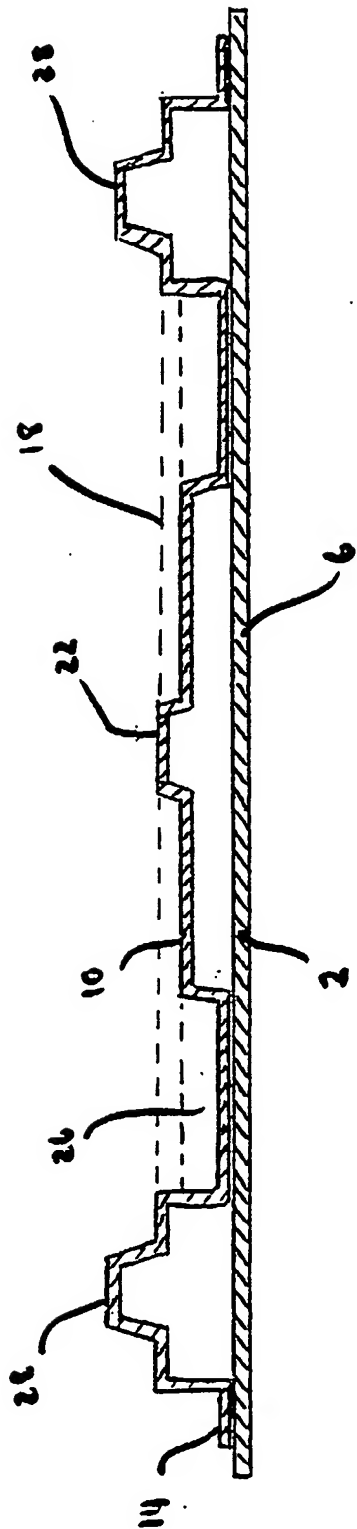


Figure 2

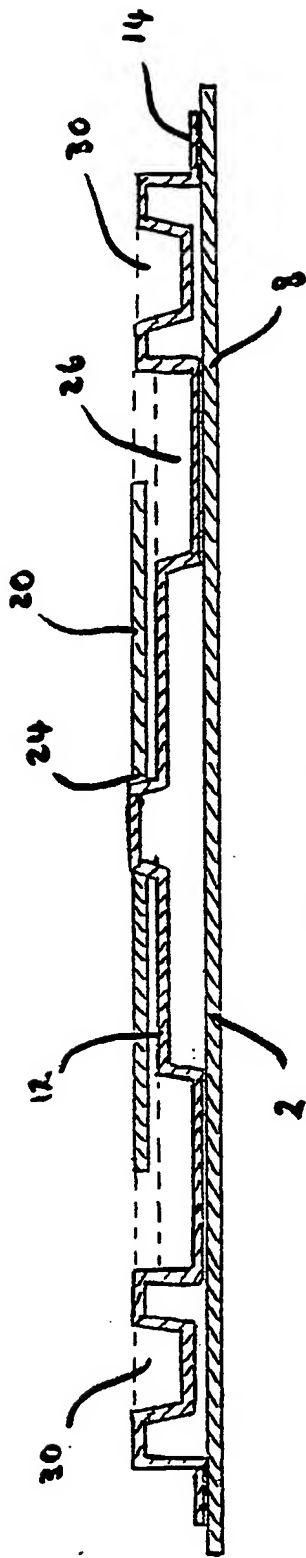


Figure 3

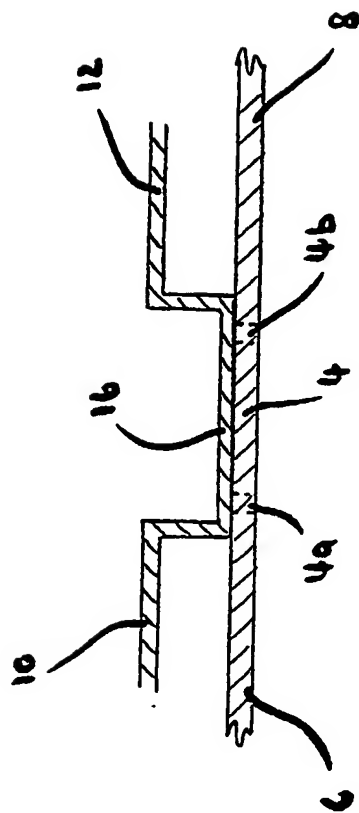


Figure 4

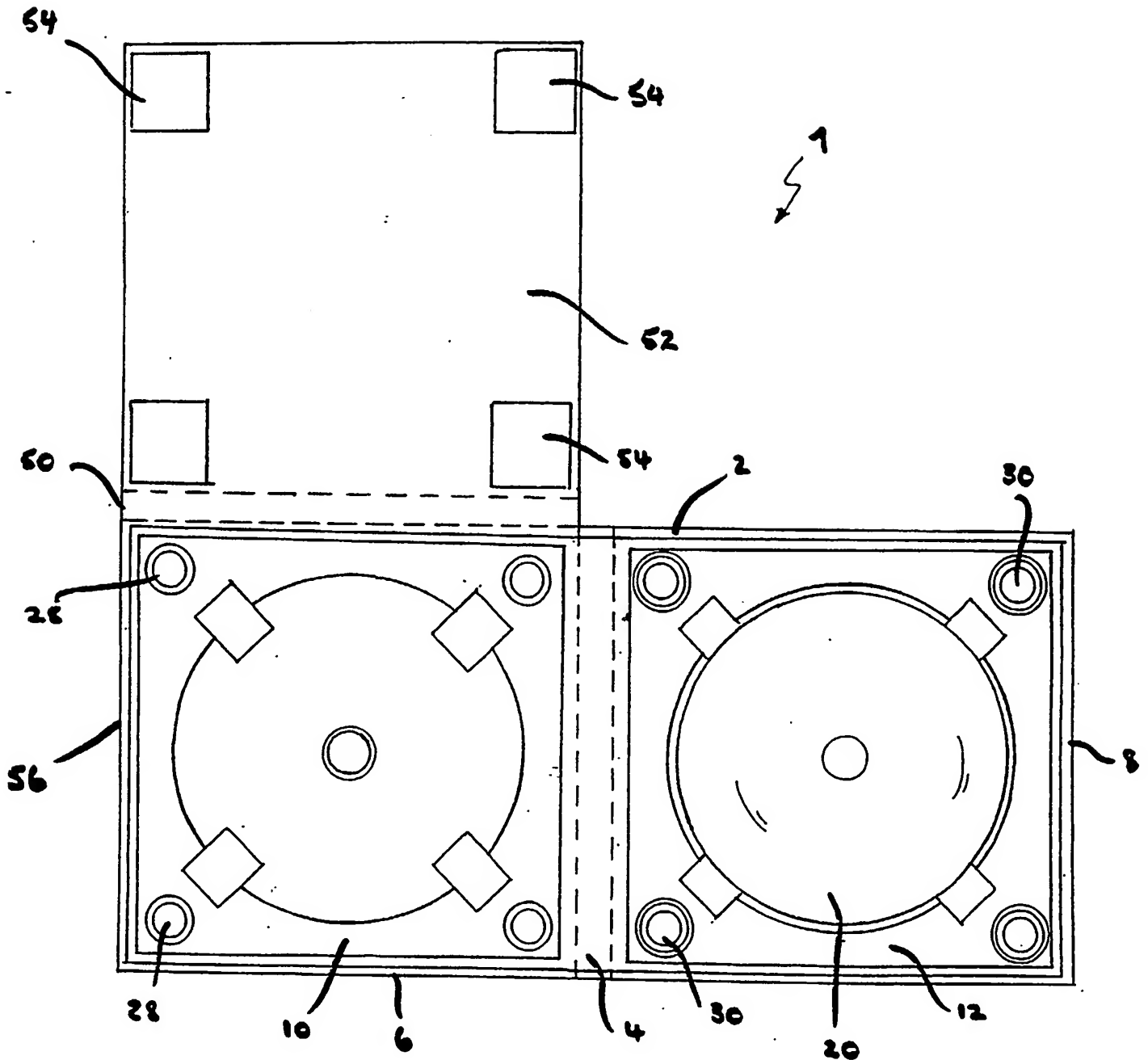
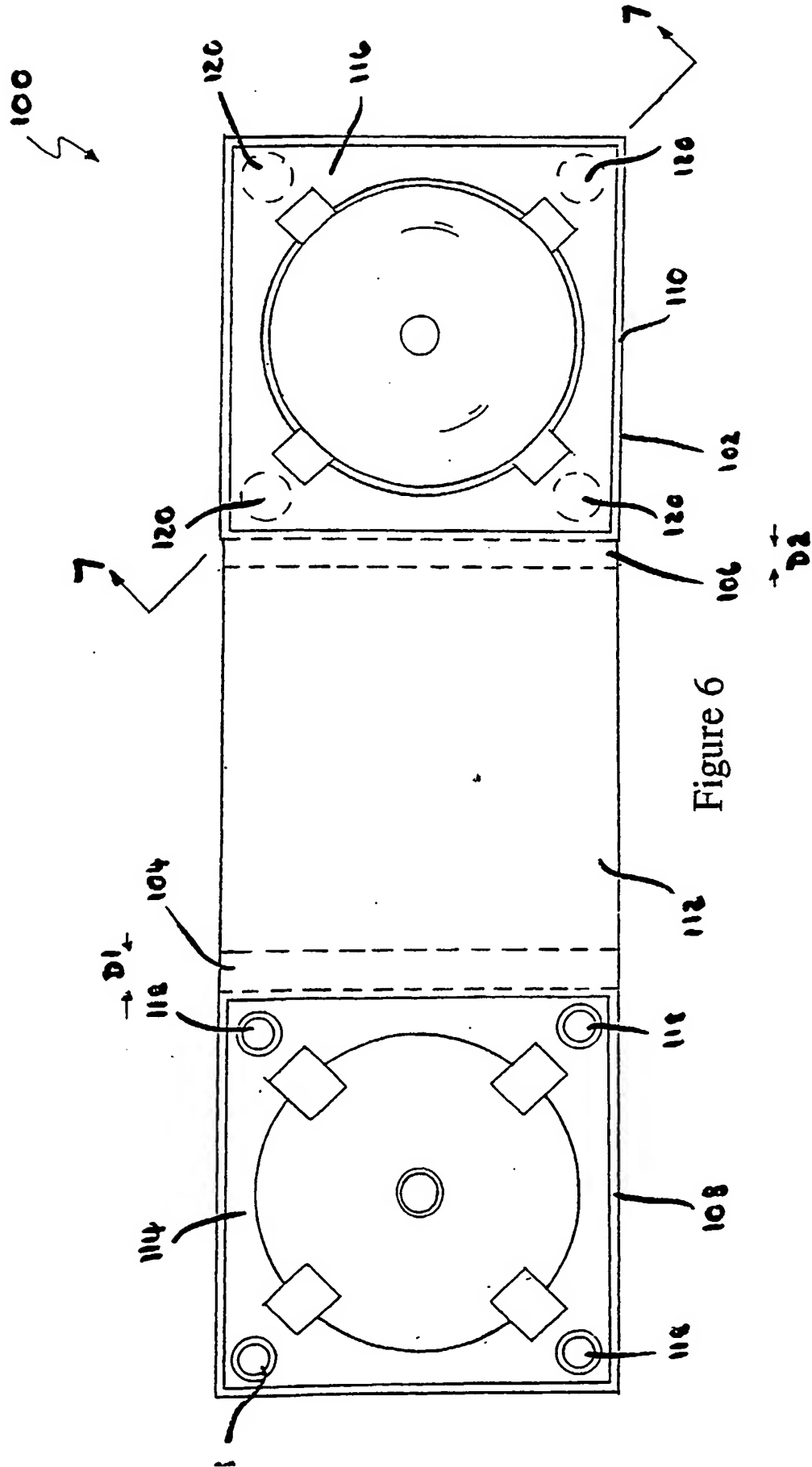


Figure 5



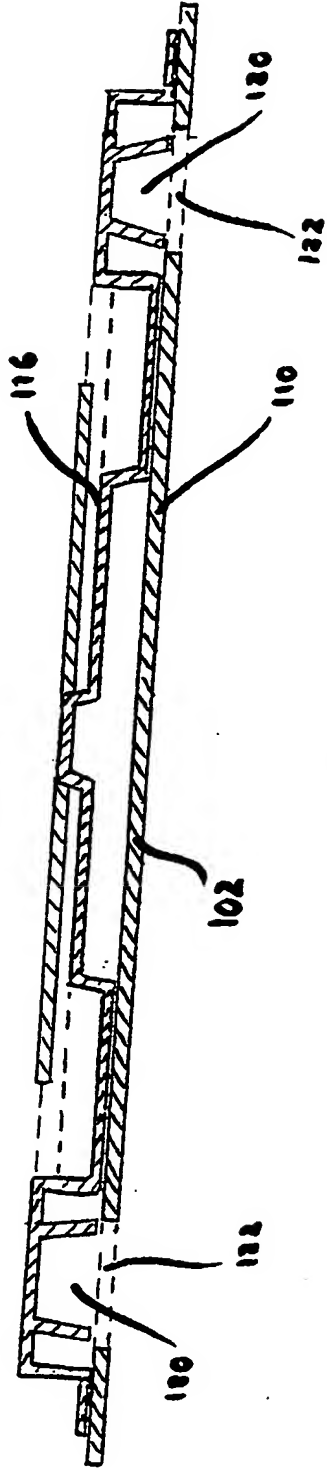


Figure 7



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2

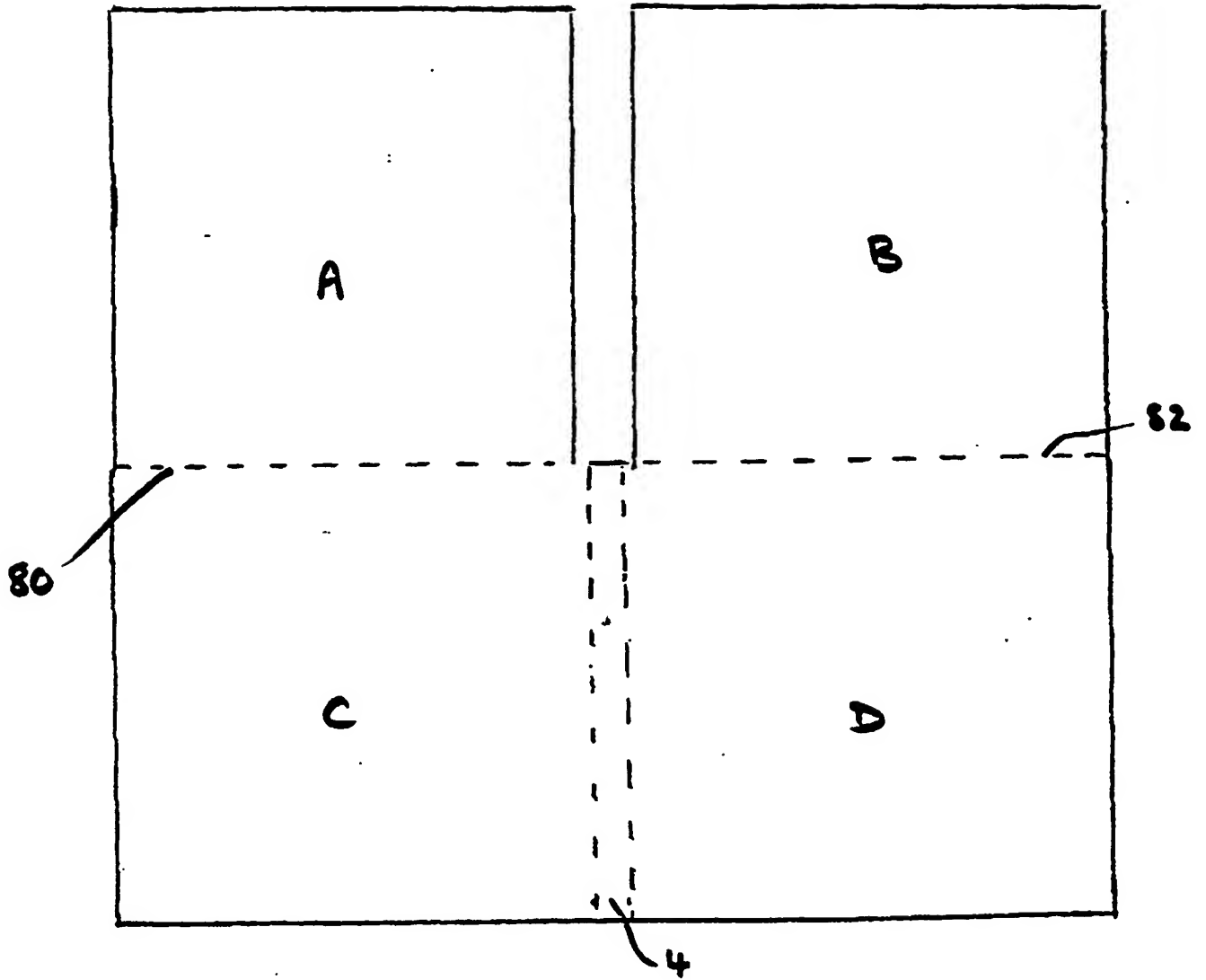


Figure 8

TITLE

Optical Disc Packs

DESCRIPTIONTechnical Field

The present invention relates to optical disc packs and in particular, to optical disc packs that have an increased surface area available for printing and are cheap to produce.

The term optical discs is intended to include Compact Disc records (CDs), CD-ROMs and Digital Video Discs (DVDs).

Background Art

Broadly speaking there are two types of optical disc pack currently available: rigid packs made from plastics material and flexible packs made from board.

The most common type of rigid optical disc pack is a so-called Jewel Case formed from a lid and a base that are hinged together. The base generally has a plastics material insert that includes a recess for receiving the optical disc. The optical disc is then held in position by a circular array of engaging means that engage with the central hole in the disc.

The hinge between the lid and the base is provided by a pair of arms formed on the lid. Each of the arms has a pin that engages with a corresponding hole in the base. The arms are not very strong and often snap off, thereby rendering the pack useless.

Jewel Cases also have a limited surface area available for printing. The difficulties involved with printing directly onto plastics material mean that it is more usual to print onto a card or paper sheet. The sheet must then be held

the card or paper sheet must be inserted by hand. This creates additional assembly problems.

The second type of optical disc pack is a flexible pack made from board. These are usually produced as blanks that are then folded to form an envelope. An example of such a flexible optical disc pack is disclosed in GB 2147262. The flexible packs have lots of surface area available for printing but they are not rigid enough to properly protect the optical disc from sustained damage.

The purpose of the present invention is therefore to provide a optical disc pack that is sufficiently rigid but which has a large surface area available for printing. The optical disc pack is also cheap and easy to manufacture.

#### The Invention

The present invention provides a optical disc pack comprising:

- a laminar cover having a spine defining mutually parallel fold lines along a first of which the spine is hinged to a first cover sheet and along a second of which the spine is hinged to a second cover sheet;

- a first disc holding tray attached to the first cover sheet and having a recess for receiving a first disc; and

- a second disc holding tray attached to the second cover sheet and having a recess for receiving a second disc;

wherein the first disc holding tray has at least one locking lug and the second disc holding tray has at least one locking hole, such that when the cover is folded along the first and second fold lines, the first and second disc holding trays are brought into register and can be releasably locked together through engagement of the locking lug or lugs with the locking hole or holes.

The laminar cover may also include a second spine defining mutually parallel fold lines. A first fold line may hinge the spine to one of the first and second cover sheets and a second fold line may hinge the spine to an insert sheet.

When the cover is folded along the first and second fold lines of the second spine, the insert sheet is brought into register with the first or second cover sheet. However, the locking lug or lugs must still be able to engage with the locking hole or holes when the pack is closed and so the insert sheet is preferably provided with at least one cut-out portion through which the engagement can take place.

The second spine may be parallel or perpendicular to the spine provided between the first and second cover sheets.

The insert sheet provides additional surface area for printing and helps to retain the optical disc within the pack.

The laminar cover is preferably formed from Folding Box Board (FBB). The FBB may have a thickness of 300 to 500  $\mu\text{m}$ , and most preferably a thickness of 400  $\mu\text{m}$ . Because the laminar cover is formed from FBB as opposed to a plastics material it is much easier to print on. The cover may also be printed on both sides as required.

The first and second disc holding trays may be thermoformed from a sheet of plastics material using either vacuum or pneumatic pressure moulding. The plastics material sheet may have a thickness of 200 to 400  $\mu\text{m}$ , and most preferably of 300  $\mu\text{m}$ . If the laminar base is printed on both sides then the plastics material is preferably transparent so that the printing is visible through the disc holding trays. However, if the laminar

The first and second disc holding trays may be formed individually or in a single piece with a central spine.

The plastics material is typically UPVC but may also be lenticular material. This is a type of lens material used to create 3-dimensional and holographic effects from a 2-dimensional printed design and includes a number of fine striations on its surface.

The disc holding trays are sufficiently rigid to protect the optical discs when the pack is closed but are cheap and easy to produce.

The first and second disc holding trays further may include at least one finger recess to facilitate extraction of a disc contained therein. The first and second disc holding trays will typically include ribbing or corrugations for extra rigidity. If the disc holding trays are thermoformed from transparent plastics material, then the ribbing or corrugations may be positioned so as to obscure the adhesive used to attach the disc holding trays to the cover.

The first and second disc holding trays are preferably attached to the first and second cover sheets respectively by adhesive. The adhesive may be hot melt permanent adhesive and may be sprayed onto the cover or stencilled. If the first and second disc holding trays are thermoformed as a single piece with a central spine then the central spine is preferably attached to the spine provided between the first and second cover sheets with adhesive.

The locking lug or lugs and the locking hole or holes may be circular, triangular or rectangular in outline. They may be of any size but preferably as large as possible

The engagement between each locking lug and locking hole is typically a snap-fit engagement.

The present invention also provides an alternative optical disc pack comprising:

- a laminar cover having a spine defining mutually parallel fold lines along a first of which the spine is hinged to a first cover sheet and along a second of which the spine is hinged to a second cover sheet;

- an inner container having a spine defining mutually parallel fold lines along a first of which the spine is hinged to a first disc holding tray having a recess for receiving a first disc and along a second of which the spine is hinged to a second disc holding tray having a recess for receiving a second disc;

- wherein the spine of the laminar cover is attached to the spine of the inner container; and

- wherein the first disc holding tray has at least one locking lug and the second disc holding tray has at least one locking hole, such that when the inner container is folded along the first and second fold lines of its spine, the first and second disc holding trays are brought into register and can be releasably locked together through engagement of the locking lug or lugs with the locking hole or holes.

The spine of the laminar cover is preferably attached to the spine of the inner container by means of an adhesive. The adhesive may be hot melt permanent adhesive and may be sprayed onto the cover or stencilled.

The present invention also provides a further alternative optical disc pack comprising:

- a laminar cover having a first spine defining mutually parallel fold lines along a first of which the spine is hinged to a first cover sheet and along a second of which the spine is hinged to a base sheet, and a second spine, parallel to the first spine, defining mutually

parallel fold lines along a first of which the spine is hinged to a second cover sheet and along a second of which the spine is hinged to the base sheet;

a first disc holding tray attached to the first cover sheet and having a recess for receiving a first disc; and

a second disc holding tray attached to the second cover sheet and having a recess for receiving a second disc;

wherein the first disc holding tray has at least one locking lug, the second disc holding tray has at least one locking hole and the second cover sheet has at least one cut-out portion aligned with, and providing access to, the locking hole or holes;

such that when the cover is folded along the first and second fold lines of the second spine, the second disc holding tray is brought into register with the base sheet, and when the cover is folded along the first and second fold lines of the first spine, the first and second disc holding trays are brought into register and releasably locked together through engagement of the locking lug or lugs with the locking hole or holes through the cut-out portions in the second cover sheet.

#### Drawings

Figure 1 shows an optical disc pack according to a first embodiment of the present invention;

Figure 2 is a cross-sectional view taken along line 2-2 of Figure 1;

Figure 3 is a cross-sectional view taken along line 3-3 of Figure 1;

Figure 4 is a cross-sectional view taken along line 4-4 of Figure 1;

Figure 5 shows the optical disc pack of Figure 1 with an additional insert sheet;

Figure 6 shows an optical disc pack according to a third embodiment of the present invention:

Figure 7 is a cross-section view taken along line 7-7 of Figure 6; and

Figure 8 shows a cover which forms part of the optical disc pack of Figure 1.

With reference to Figures 1 to 4, an optical disc pack 1 is shown to have a laminar cover 2 made of 400  $\mu$ m thick Folding Box Board (FBB). The cover 2 is printed on both sides with a design (not shown).

The cover 2 has a central spine 4 which is pressure formed by passing the cover 2 through a cutting and creasing machine (see below). The spine 4 is defined by mutually parallel first and second fold lines 4a and 4b separated by a distance D which determines the overall thickness of the optical disc pack 1. The spine 4 divides the cover 2 into a first cover sheet 6 and a second cover sheet 8. The outer dimensions of the cover 2 and the overall thickness of the optical disc pack 1 are selected so that when the pack 1 is closed by being folded along the first and second fold lines 4a, 4b it can be held in conventional holders or racks.

The optical disc pack 1 has a first disc holding tray 10 and a second disc holding tray 12. Both the first and second disc holding trays 10, 12 are thermoformed using pneumatic pressure moulding from a 300  $\mu$ m sheet of plastics material. The plastics material is UPVC and is transparent so that the design printed on the inner surface of the cover 2 can be seen.

The first disc holding tray 10 has a peripheral skirt 14 which is attached to the first cover sheet 6 by means of an adhesive. The second disc holding tray 12 is attached to the second cover sheet 8 in a similar way. The adhesive is a hot melt permanent adhesive which is either sprayed onto the cover 2 or applied with a stencil.



The disc holding trays can be thermoformed individually or in a single piece. In Figure 1 the disc holding trays have been thermoformed in a single piece and are joined together by a spine 16 (Figure 4). The spine 16 is aligned with the spine 4 and is attached to it by means of an adhesive. Once again, the adhesive is a hot melt adhesive which is either sprayed onto the spine 4 or applied with a stencil.

Although not illustrated, the disc holding trays 10, 12 can be left unattached to the first and second cover sheets 6, 8 as long as the spine 16 is firmly attached to the spine 4. This is only possible where the disc holding trays 10, 12 have been thermoformed in a single piece and gives the optical disc pack a kind of "book" format.

The optical disc pack 1 is designed to hold two standard optical discs, one in each disc holding tray 10, 12. Alternatively one of the trays of the pack 1 can hold a circular booklet (not shown) having the same diameter as a standard optical disc. The circular booklet can contain information about the music tracks or programs stored on the optical discs.

The disc holding trays 10, 12 each include a circular recess 18 having a depth and diameter selected to receive a standard optical disc 20. The circular recess 18 has a central projection 22 which is designed to engage with the centre hole 24 of a standard optical disc to retain the optical disc 20 within the disc holding trays 10, 12 whilst the pack 1 is being closed.

Four finger recesses 26 are provided at regular intervals around the circumference of the circular recess 18. The finger recesses 26 extend radially across the circumference of the circular recess 18 so that a finger can slide underneath the optical disc 20 to extract it

from the central projection 24 and remove it from the pack 1.

As shown in Figures 2 and 3, the finger recesses 26 are sufficiently deep such that their underside is also attached to the cover 2 by means of adhesive. This provides an additional way in which the disc holding trays 10, 12 are secured to the cover 2.

The first disc holding tray 10 has four locking lugs 28 and the second disc holding tray 12 has four complementary locking holes 30. However, a greater or lesser number of locking lugs and complementary locking holes can be provided as required. The locking lugs 28 are positioned such that they engage with the locking holes 30 and releasably secure the first and second disc holding trays 10, 12 together when the pack 1 closed by folding the cover 2 along the first and second fold lines 4a, 4b. The engagement between the locking lugs 28 and locking holes 30 is preferably snap-fit.

The locking lugs 28 and locking holes 30 shown in Figure 1 are circular in outline but they are not limited to this shape and can be rectangular or triangular if necessary. However, the locking lugs 28 should generally be as large as possible and non-compressible so that they continue to engage properly with the locking holes 30 even after the pack 1 has been opened and closed several times.

In an alternative embodiment illustrated in Figure 5, the cover 2 is L-shaped and includes a second spine 50 at right angles to the first spine 4. The second spine 50 further divides the cover 2 to form an insert sheet 52. The insert sheet can be folded over onto the first cover sheet 6 and is provided with cut-outs 54 at positions corresponding to the locking lugs 28 on the first disc holding tray 10. This allows the locking lugs 28 to engage with the locking holes 30 of the second disc

holding tray 12 through the insert sheet 52. The insert sheet 52 provides additional space for printing and helps to retain the optical disc within the circular recess 18.

Although not illustrated, the second spine 50 could be parallel to the first spine 4 so that the insert sheet is hinged to the side 56 of the first cover sheet 6. A third spine, either at right angles or parallel to the first spine 4, can also be provided to form a similar insert sheet hinged to the second cover sheet 8.

With reference to Figures 6 and 7, an optical disc pack 100 is shown to have a laminar cover 102 made of 400  $\mu\text{m}$  thick Folding Box Board (FBB).

The cover 102 has a first spine 104 and a second spine 106 which are pressure formed by passing the cover 102 through a cutting and creasing machine. The first and second spines 104, 106 divide the cover 102 into a first cover sheet 108, a second cover sheet 110 and a base sheet 112. The first spine 104 is formed from two parallel fold lines which are separated by a distance  $D_1$ . The second spine 106 is similarly formed from two parallel fold lines separated by a distance  $D_2$ . The distance  $D_1$  is larger than  $D_2$  so that the pack 100 can be closed as described below.

The optical disc pack 100 has a first disc holding tray 114 and a second disc holding tray 116. Both the first and second disc holding trays are thermoformed using pneumatic pressure moulding from a 300  $\mu\text{m}$  sheet of plastics material which in this case is UPVC.

The first disc holding tray 114 has four locking lugs 118 and the second disc holding tray 116 has four complementary locking holes 120. However, unlike the optical disc pack 1 illustrated in Figures 1 to 5, the locking holes 120 face the side of the second disc holding

tray 116 which is attached to the second cover sheet 110. The second cover sheet 110 is also provided with cut-outs portions 122 (Figure 7) which are aligned with the locking holes 120 and provide access to them.

To close the optical disc pack 100, the cover 102 is folded along the fold lines of the second spine 106 so that the second disc holding tray 116 comes into register with the base sheet 112. The cover 102 is then folded along the fold lines of the first spine 104 so that the first disc holding tray 114 comes into register with the second cover sheet 110 (and also with the second disc holding tray 116). The locking lugs 118 are positioned on the first disc holding tray 114 such that they engage with the locking holes 120 through the cut-out portions 122 and releasably secure the first and second disc holding trays 114, 116 together.

The optical disc pack can be manufactured as follows:

- (1) A Folding Box Board (FBB) sheet is printed. It can either be printed on one side or both sides as required.
- (2) The FBB sheet is then cut to size to form a laminar cover and the fold lines which form the spine are applied with pressure. This step can be carried out in one operation by passing the sheet through a conventional cutting and creasing machine.
- (3) The first and second disc holding trays are created by pneumatic pressure moulding. The first and second disc holding trays can be moulded individually or in a single piece connected by a spine.
- (4) The cover is passed through a conventional gluing machine which applies adhesive to the cover in the appropriate places. Up to a maximum of 8 different places can be

glued. The adhesive can be sprayed onto the cover or applied with a stencil.

- (5) The first and second disc holding trays are then attached to the cover to form the complete optical disc pack.
- (6) As a final step the optical disc pack can be closed by folding the cover along the fold lines until locking lugs provided on the first disc holding tray engage with locking holes provided on the second disc holding tray.

With reference to Figure 8, the FBB sheet can also be cut to form a U-shaped cover 2 having four portions A to D with a central spine 4 and fold lines 80 and 82. The sheet can then be printed on one side using a conventional printing machine. Finally, portions A and B are folded along fold lines 80 and 82 and glued onto portions C and D respectively. The cover 2 is then effectively printed on both sides.

Although not shown, the FBB sheet can also be cut to form a rectangular shaped cover having four portions A to D arranged in the order A-C-D-B. Portions A and B can then be folded along fold lines and glued onto portions C and D respectively in the same way as described above.

CLAIMS

1. An optical disc pack comprising:

a laminar cover having a spine defining mutually parallel fold lines along a first of which the spine is hinged to a first cover sheet and along a second of which the spine is hinged to a second cover sheet;

a first disc holding tray attached to the first cover sheet and having a recess for receiving a first disc; and

a second disc holding tray attached to the second cover sheet and having a recess for receiving a second disc;

wherein the first disc holding tray has at least one locking lug and the second disc holding tray has at least one locking hole, such that when the cover is folded along the first and second fold lines, the first and second disc holding trays are brought into register and can be releasably locked together through engagement of the locking lug or lugs with the locking hole or holes.

2. An optical disc pack according to claim 1, wherein the laminar cover includes a second spine defining mutually parallel fold lines along a first of which the spine is hinged to one of the first and second cover sheets and along a second of which the spine is hinged to an insert sheet.

3. An optical disc pack according to claim 2, wherein the insert sheet has at least one cut-out portion such that when the cover is folded along the first and second fold lines of the second spine, the insert sheet is brought into register with the first or second disc holding tray with the cut-out portion or portions aligned with the locking lug or lugs or the locking hole or holes.

4. An optical disc pack according to claim 2 or claim 3, wherein the second spine is parallel to the spine provided between the first and second cover sheets.

5. An optical disc pack according to claim 2 or claim 3, wherein the second spine is perpendicular to the spine.
6. An optical disc pack according to any preceding claim, wherein the laminar cover is formed from Folded Box Board (FBB).
7. An optical disc pack according to claim 6, wherein the FBB has a thickness of 400  $\mu\text{m}$ .
8. An optical disc pack according to any preceding claim, wherein the first and second disc holding trays are thermoformed from plastics material.
9. An optical disc pack according to claim 8, wherein the first and second disc holding trays are formed by pneumatic pressure moulding.
10. An optical disc pack according to claim 8 or claim 9, wherein the first and second disc holding trays are thermoformed in a single piece with a central spine.
11. An optical disc pack according to any of claims 8 to 10, wherein the plastics material has a thickness of 300  $\mu\text{m}$ .
12. An optical disc pack according to any of claims 8 to 11, wherein the plastics material is lenticular material.
13. An optical disc pack according to any preceding claim, wherein the first and second disc holding trays further include at least one finger recess to facilitate extraction of a disc contained therein.
14. An optical disc pack according to any preceding claim, wherein the first and second disc holding trays are

attached to the first and second cover sheets respectively by adhesive.

15. An optical disc pack according to claim 10, wherein the central spine is attached to the spine provided between the first and second cover sheets by adhesive.

16. An optical disc pack according to claim 14 or claim 15, wherein the adhesive is hot melt permanent adhesive.

17. An optical disc pack according to any preceding claim, wherein the at least one locking lug and the at least one corresponding locking hole are circular in outline.

18. An optical disc pack according to any preceding claim, wherein the cover is printed on at least one side.

19. An optical disc pack according to any preceding claim, wherein the first and second disc holding trays include ribbing or corrugations for extra rigidity.

20. An optical disc pack comprising:

a laminar cover having a spine defining mutually parallel fold lines along a first of which the spine is hinged to a first cover sheet and along a second of which the spine is hinged to a second cover sheet;

an inner container having a spine defining mutually parallel fold lines along a first of which the spine is hinged to a first disc holding tray having a recess for receiving a first disc and along a second of which the spine is hinged to a second disc holding tray having a recess for receiving a second disc;

wherein the spine of the laminar cover is attached to the spine of the inner container; and

wherein the first disc holding tray has at least one locking lug and the second disc holding tray has at least one locking hole, such that when the inner container is



folded along the first and second fold lines of its spine, the first and second disc holding trays are brought into register and can be releasably locked together through engagement of the locking lug or lugs with the locking hole or holes.

21. An optical disc pack comprising:

- a laminar cover having a first spine defining mutually parallel fold lines along a first of which the spine is hinged to a first cover sheet and along a second of which the spine is hinged to a base sheet, and a second spine, parallel to the first spine, defining mutually parallel fold lines along a first of which the spine is hinged to a second cover sheet and along a second of which the spine is hinged to the base sheet;

- a first disc holding tray attached to the first cover sheet and having a recess for receiving a first disc; and

- a second disc holding tray attached to the second cover sheet and having a recess for receiving a second disc;

- wherein the first disc holding tray has at least one locking lug, the second disc holding tray has at least one locking hole and the second cover sheet has at least one cut-out portion aligned with, and providing access to, the locking hole or holes;

- such that when the cover is folded along the first and second fold lines of the second spine, the second disc holding tray is brought into register with the base sheet, and when the cover is folded along the first and second fold lines of the first spine, the first and second disc holding trays are brought into register and releasably locked together through engagement of the locking lug or lugs with the locking hole or holes through the cut-out portions in the second cover sheet.



INVESTOR IN PEOPLE

Application No: GB 0014675.3  
Claims searched: 1 to 21

17

Examiner: Mike Henderson  
Date of search: 9 November 2001

## Patents Act 1977 Search Report under Section 17

### Databases searched:

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:

UK Cl (Ed.S): B8P (PL6 PE2B PE2C PK5)

Int Cl (Ed.7): B65D G11B 33/04

Other: ONLINE:WPI,EPODOC,JAPIO

### Documents considered to be relevant:

Category	Identity of document and relevant passage		Relevant to claims
X,E	WO 01/48757A1	(MOULAGES DU VELAY SA) (Whole disclosure relevant)	1,8 & 13
X,Y	US 5950821	(MOSER) (Whole disclosure relevant)	X:Cl 1,6 to 9,11, 14 to 16,18 & 19 Y:Cl 10 & 20
X,Y	US 5839575	(BLANCO) (Whole disclosure relevant)	X:Cl 1,6 to 9,11, 13 to 16 & 18 Y:Cl 10 & 20
Y	US 4623062	(CHASE et al) (Fig.5 & corresponding description most relevant)	10 & 20

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Y Document indicating lack of inventive step if combined with

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